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THE EDENTATA OF NORTH AMERICA.

BY E. D. COPE.

NORTH America has possessed during late Cænozoic times a limited number of species of Edentata, which have been outliers of the great horde which has peopled South America since the Eocene.

This order embraces two suborders, whose characters were first noticed by Flower,[1] and whose names were given by Gill.[2]

Mutual articulations of posterior dorsal and lumbar vertebræ normal;	*Nomarthra.*
Posterior dorsal and lumbar vertebræ with episphen and zygantrapophyses which bear articular surfaces;	*Xenarthra.*

Of these divisions it is evident that the Nomarthra are the least specialized, and must be regarded as ancestral to the Xenarthra. Neither of the living families of Nomarthra can, however, claim this position, as they are too specialized in various parts of their structure. They are now exclusively Old World, while the Xenarthra are confined to the New World. The families are distinguished as follows:

NOMARTHRA.

No dermal scuta; teeth, each composed of parallel dental elements;	*Orycteropodidæ.*
Body covered with corneous scuta; no teeth;	*Manidæ.*

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[1] Osteology of the Mammalia, 1870, p. 55.

[2] Standard Natural History, 1884, p. 66.

XENARTHRA.

Astragalus and calcaneum elongate; latter without trochlea; no dermal bones; unguiculate; teeth (sloths);	*Bradypodidæ.*
Astragalus and calcaneum short, former with trochlea; unguiculate; teeth; no dermal bones;	*Megatheriidæ.*
Astragalus short, with trochlea; on dermal bones; unguiculate; no teeth (anteaters);	*Myrmecophagidæ.*
Astragalus short, with trochlea; a carapace of dermal bones; subunguiculate; teeth simple (armadillos);	*Dasypodidæ.*
Astragalus short, with trochlea; a carapace of dermal bones; posterior feet ungulate; teeth sculptured by vertical grooves;	*Glyptodontidæ.*

Common ancestors of the Nomarthra and Xenarthra are unknown. But few extinct representatives of the Nomarthra are known.[3] A Manis has been obtained in the Sivaliks of India, and a genus Palæomanis (Forsyth Major) from the Miocene beds of the island of Samos in the Grecian Archipelago. The *P. gigantea* is three times as large as the largest existing species. The same locality has yielded a species of Orycteropus.

The existing forms of the Xenarthra appear to be widely separated from each other, but paleontological discovery has greatly narrowed the intervals between them, so that the homogeneity of the order is certain. Thus the Megatheriidæ are equally allied to the ant-eaters, the sloths, and the armadillos, and such genera as Nothropus and Chlamydotherium connect these with the Glyptodons. The carapace is rudimental in genera both of Glyptodontidæ and Megatheriidæ. The Megatheriidæ also indicate a point of contact with other orders of mammals, as M. Ameghino has discovered some extinct genera from the Parana, in which the teeth possess a narrow band of enamel. The connection is to the Bunotheria, which were probably the ancestors of the Edentata.

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[3] The *Pangolin gigantesque* of Cuvier, was referred to a genus Macrotherium by Lartet, and allied forms have been placed in a genus Ancylotherium in Europe and Moropus in America. Macrotherium turns out from the researches of Filhol to have no definite relation to the Edentata, and to be founded on the foot-bones of Chalicotherium. Chalicotherium must be then widely distinguished from the Perissodactyla, where it has been placed. I have proposed a new order, the Ancylopoda, to receive it. See Osborn in AMERICAN NATURALIST, 1888, p. 758, and Cope, l. c. 1889, p. 153.

The Megatheriidæ are probably the ancestors of both the Bradypodidæ and the Myrmecophagidæ. The modification of the tarsus characteristic of the former is probably due to the assumption of the habit of suspension from limbs of trees by the ancestors of the sloths. This is not only probable from the mechanics of the case, where support on the ground has been followed by suspension below a branch, but also by the analogy of the bats. In these animals, as Dr. H. Allen has pointed out, the similar habit of suspension has produced in the hind limb a similiar modification of the forms of the astragalus and calcaneum.

The Megatheriidæ embrace a large variety of genera, all extinct, and nearly all restricted to the Neotropical Realm. They embrace mostly species of large size, though there is much variation in dimensions. They differ in the number of digits, and the extent to which progression was accomplished on the external edge or sole of the foot. They are also distinguished into Mylomorpha and Rodimorpha (Ameghino), the former having a homogeneous molar dentition, the latter having the anterior tooth in each jaw developed into a canine-like form and function. These types graduate into each other through the genera Mylodon and Lestodon, but not so completely as to destroy the diagnostic value of the character. The genera may be then distinguished as follows:

I. Mylomorpha.

α Molar teeth $\frac{4}{3}$.

Molars with two cross-crests; *Cœlodon* Lund.

αα Molar teeth $\frac{4}{4}$.

Molars with cross-crests; *Ocnobates* Cope.[4]
Molars not ridged; nasal bones connected
with premaxillary spine; *Grypotherium* Reinh.

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[4] Orocanthus, Ameghino; preoccupied.

aaa Molars $\frac{5}{4}$.

Molars with two cross-crests;	*Megatherium* Cuv.
Molars simple; last not elongate;	*Scelidotherium* Owen.
Molars simple; last elongate, grooved;	*Mylodon* Owen.

II. Rodimorpha.

a Molar teeth $\frac{5}{4}$.

Molars with two cross-crests;	*Pliomorphus* Amegh.
Molars simple, last elongate;	*Lestodon* Gerv.
Molars simple, none elongate, canines widely separated; claws compressed;	*Megalonyx* Jeff.
Molars simple; canines close together;	*Diodomus* Ameg.

Besides these, there are several genera described by M. Ameghino, of which the characters are not yet accessible to me. Thus Promegatherium[5] differs from Megatherium by the presence of a band of enamel on the inner side of the molar teeth, but the number of these is unknown. Promylodon[6] Amegh. differs from Mylodon in the same way, but here also the number of these teeth, and other characters, are unknown.

The genera of this family known to occur in North America are Megatherium, Mylodon, and Megalonyx. Of the first, a single species, *M. mirabile* Leidy, is known. It was a large animal, exceeding the Indian Rhinoceros in dimensions. Its remains have been found as yet only in the Pliocene of the Southern States. Mylodon is represented by two species, *M. laqueatus* Harlan, from the eastern region of the continent as far north as Pennsylvania, and *M. sodalis* Cope (Fig. 1), from the Pliocene beds of Oregon. Both were large animals, not smaller than an ox in dimensions. Megalonyx is represented by a larger number of species. The *M. jeffersonii* Cuvier has a geographical range nearly equal to that of the *Mylodon laqueatus*, while another species (Plate XXXI.) has been only found in the Ticholeptus formation of Kansas. In Pennsylvania the bone caves have yielded the teeth of *M. loxodon* Cope, *M. dissimilis* Leidy, and *M. tortulus* Cope.

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[5] Bol. Acad. Nac. Cienc. Cordova, 1883, p. 293.

[6] Bollet. Acad. Nac. de la Cienc., Cordova, 1886, p. 184.

These huge beasts were all vegetable feeders, living on the foliage of the trees which they uprooted, or whose branches they could reach. They are of late arrival in North America, and two genera, Megatherium and Mylodon, are each represented by species which persisted to or even into the period of human occupation.

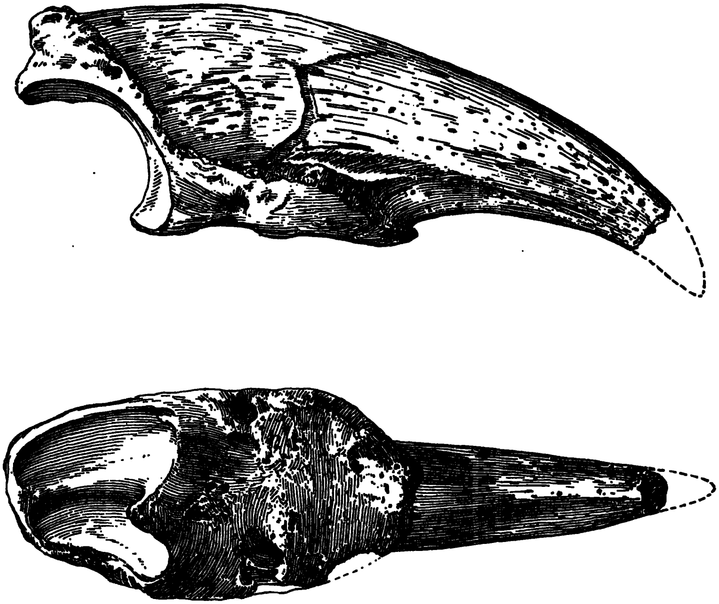

FIG. 1.

In the Myrmecophagidæ, the terrestrial habit has been retained, but the disuse of the teeth, following the habit of swallowing ants whole in saliva, has resulted in their loss. Corresponding habits and loss of teeth are seen in the Old World Manidæ. No extinct species are known.

The ancestors of the Glyptodontidæ from the Miocene of the Parana, like those of the Megatheriidæ from the same region, possess narrow bands of enamel on the teeth. This discovery, made by Ameghino, confirms the anticipation expressed by myself,[7] that the Edentata are descended from mammalia with enamel-covered teeth. Such forms as the Tæniodonta of the North American Eocene correspond to such a type. These animals were armed with the powerful fodient claws, and the texture of their bones was much like that of Edentata. The enamel is much reduced on the adjacent faces of the teeth.

Ancestral forms of some of the families have been found in the upper Miocene (Loup Fork) beds of North America. The *Caryoderma snovianum* Cope, from Kansas, was a Glyptodont with partially developed carapace, consisting of osseous nodules. (Plate XXXII.) The plates covering the tail were better ossified, apparently forming rings of acuminate tuberosities as in the genus Hoplophorus. Hoofs of a similar form, from Texas, are described by Leidy. The genus Glyptodon exextended its range to North America during Pliocene time. A species was abundant in the valley of Mexico at that period, and specimens of probably the same from southwestern Texas and Florida have furnished the basis of our knowledge of the *G. petaliferus* Cope. (Fig. 2.) Leidy has described a still larger species (*G. floridanus*) from the state after which it is named.

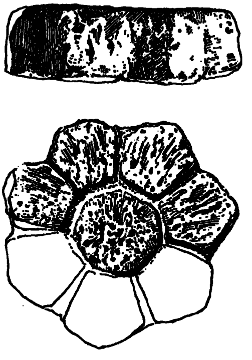

FIG. 2.

The genera of the family may be defined as follows:

I. Teeth with two internal and two external ribs.

Last two molars prismatic; grinding faces plane; *Nothropus* Burm.

II. Teeth with two internal and three external ribs. Tail with distinct rings.

Scuta of carapace nodular; (? teeth)[8] *Caryoderma* Cope.
Scuta of carapace quadrate; *Chlamydotherium* Lund.

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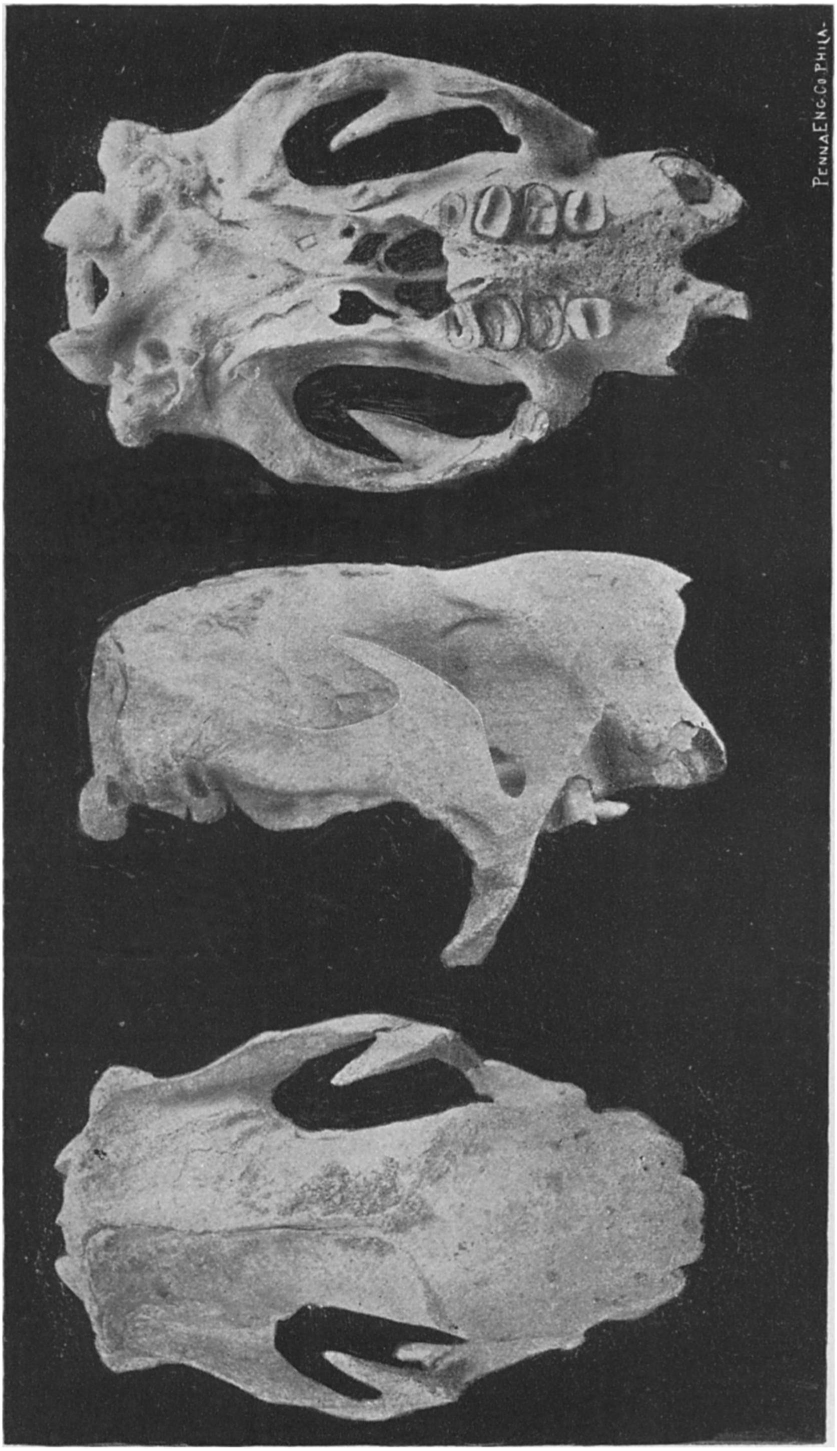
[7] U. S. G. G. Surv. W. of 100th Mer., 1887, p. 158; AMERICAN NATURALIST, 1885, p. 352.

[8] Teeth unknown.

PLATE XXXI.



Skull of Megalonyx.

III. Teeth with three internal and three external ribs.

a Tail, with distinct rings, and without terminal tube.

Digits 5-4; *Glyptodon* Owen.

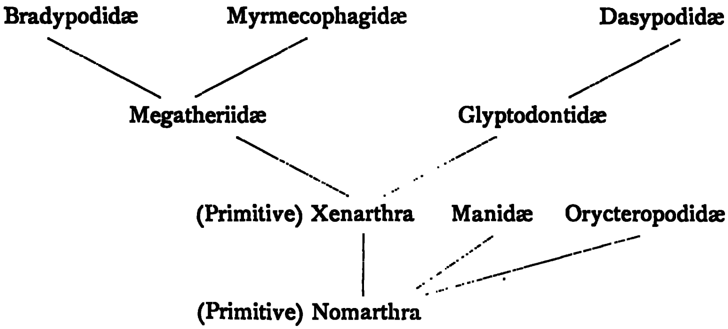
aa Distal and longer part of tail enclosed in an osseous tube.

Digits 3-4; tail probably spinous; *Dœdicurus* Burm.
Digits? Caudal tube compressed, and with enlarged lateral tubercles; *Euryurus* Gerv. and Am.
Digits 4-4; *Hoplophorus* Lund.

The species of these genera are of various dimensions. *Caryoderma snovianum* (Plate XXXII.) was about the size of a glutton or catamount, while *Chlamydotherium gigas* was nearly equal in size to a rhinoceros. The *C. humboldtii* and various species of Glyptodon and Hoplophorus might be compared to the *Tapirus americanus*. *Dœdicurus clavicaudatus* Owen reached a length of twelve feet, according to Burmeister, and its massive spinous tail was an efficient weapon. *Hoplophorus tuberculatus* Owen is said to be as large as a rhinoceros. It can be seen how greatly their existing descendants, the armadillos, have diminished in size, as well as simplified the forms of their teeth.

It is probable that the Dasypodidæ are descendants of the Glyptodontidæ by a reduction of the complexity and increase in number of the teeth. The posterior ungual phalanges of fœtal armadillos are, according to von Ihring, ungulate and trilobate, as in Glyptodontidæ. Extinct species of Dasypodidæ occur in the later Cænozoic beds of South America, most of which belong to existing genera. The principal extinct genus known is Eutatus Gerv. which usually resembles Tatusia, but has five digits on all the feet instead of four. Several species are known.

Much remains to be learned about the phylogeny of this order. The present phase of the subject may be represented as follows:



EXPLANATION OF PLATE XXXI.

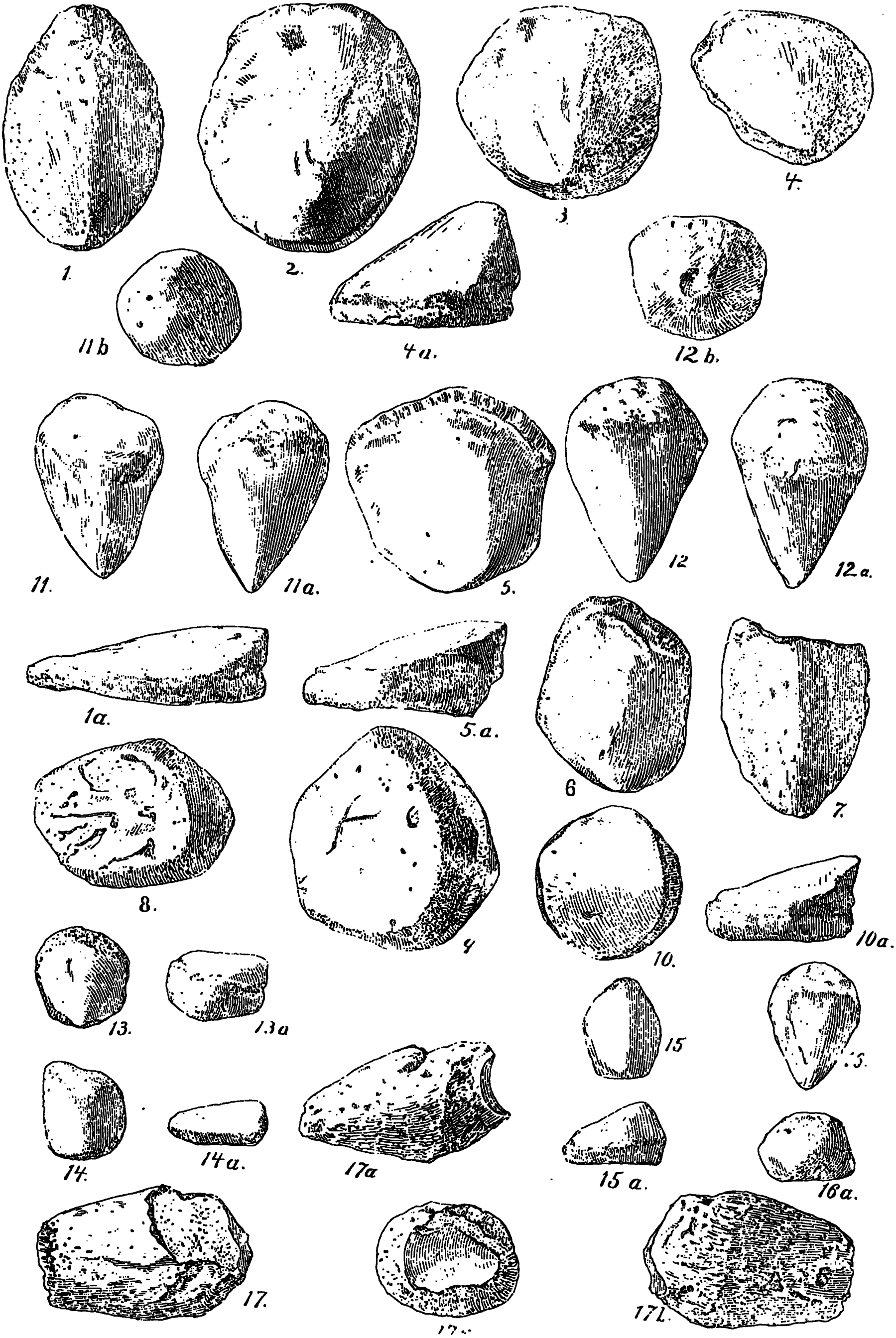
Three views of the skull of a species of Megalonyx.

EXPLANATION OF PLATE XXXII.

FIGS. 1—16. Dermal bones of *Caryoderma snovianum* Cope, natural size.

FIG. 17. Ungual phalange of do.

PLATE XXXII.



Caryoderma snovianum Cope.